Response Under 37 CFR 1.116
Expedited Procedure
Examining Group 1754
Application No. 09/914,994
Paper Dated: August 20, 2004
In Reply to USPTO Correspondence of May 20, 2004
Attorney Docket No. 388-011500

REMARKS

Claims 12-36 stand rejected under 35 U.S.C. §103(a) for obviousness over U.S. Patent No. 6,290,913 to Aoyama. Applicants respectfully traverse this rejection in view of the accompanying expert Declaration submitted pursuant to 37 C.F.R. §1.132, and for the following reasons.

The Office Action asserts that Aoyama teaches that methanization and oxidation of carbon monoxide in a gas stream may be carried out simultaneously, i.e. that one reaction does not interfere with the other reaction. The Office Action also asserts that Aoyama carries out the oxidation reaction before the methanization reaction so that hydrogen is consumed in the methanization reaction. Contrary to the Examiner's assertions that the order of these two reaction steps is immaterial since, according to Aoyama, one reaction does not interfere with the other reaction, Applicants submit the accompanying Declaration by applicant (Mr. Echigo). Mr. Echigo's expertise in the subject matter of fuel processing is demonstrated in part by the accompanying list of his publications. The Declaration details that the process of the present invention of methanization followed by oxidation reduces the total amount of hydrogen consumed relative to a process in which oxidation occurs before methanization. The Declaration also sets forth the enhanced thermal efficiency of the process of the present invention as opposed to the reverse order of the claimed steps. The Declaration provides a side-by-side example of how the process of Aoyama (oxidation prior to methanization) consumes more hydrogen and utilizes more energy than the process of the present invention.

In addition, the assertion in the Office Action that all remaining oxygen (besides the oxygen consumed in the oxidation of CO) would react with hydrogen to form oxygen is presumed to mean that all of the oxygen would react to form water. The above-described calculation of hydrogen consumption in the expert Declaration takes into account the amount of such hydrogen consumed by the remaining oxygen.

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Although the consumption of energy is not described in the pending claims, the thermal efficiency of the process of the present invention is evidence of the non-obviousness of the order of the claimed steps over the Aoyama patent.
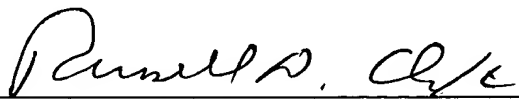
Finally, the Office Action asserts that the Aoyama process is useful in a system where the energy utilization ratio is relatively low, while the present invention can be readily used in a stationary system. However, at issue is not whether the method of the present invention is used in a stationary system, but how much energy is preserved in the fuel charged to the system that can be efficiently utilized. In the energy balance set forth in the expert Declaration, the present invention places priority on methanization. As a result, a certain amount of methane remains within the system, and this remaining methane can be reused. Claims 11 and 12 of the present application provide for reuse of the remaining methane as fuel.

In view of the foregoing and the accompanying Declaration, claims 12-36, in which energy preserved in the fuel (methane) resulting from methanization can be effectively utilized and the efficiency of the system is improved over the prior art. Reconsideration of the rejection and allowance of claims 12-36 is respectfully requested.

Respectfully submitted,

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